Alternative Narrowing Process

Small Isolated Delta Conveyance Facility

Alternative 3C

Alternative 3C utilizes a **buried pipeline** isolated facility to convey 5,000 cfs from a diversion on the Sacramento River at Hood along the eastern Delta to the Clifton Court Forebay. North and South Delta improvements and CVP & SWP improvements are also included in the alternative. The is **no new storage** proposed in this alternative.

Modification to Remove Technical Problems

There were no major technical problems identified in alternative 3C.

Functionally Equivalent Conveyance

Alternatives 3C and 3A are identical except for the type of 5,000 cfs isolated facility. Alternative 3C proposes a pipeline option for the isolated facility, while alternative 3A proposes an open canal.

Both alternatives ability to meet the Program objectives are the same. Both alternatives propose new "best feasible technology" fish screens at Hood, North and South Delta Improvements, CVP & SWP improvements, similar operational policies and the four common programs. Both do not include new storage.

The differences lie in the details of the isolated facility. Although the diversion locations and alignments of the isolated facilities in both alternatives are the same, the pumping plants, conveyance types, siphons, bridge and utility relations, right-of-way, environmental impacts, and costs differ. These differences are discussed below:

Pumping Plants

Both pumping plants would lift up to 5,000 cfs into the conveyance facility. Alternative 3A would utilize a single low operating head (10 feet) pumping plant located within the first two miles of the canal. To overcome the hydraulic head loss in the pipeline conveyance option, alternative 3C requires a pumping plant with operating head of 150 feet. The increased operating lift would substantially increase operating and energy cost. The annual energy cost for the canal option pumping plant is around $1 million per year, whereas the pipeline option is around $12

million per year, based on a power rate of 40 mills. Given that the site acreage for the two pumping plants are about the same there would little differences in environmental impacts between the two plants.

Conveyance Types and Environmental Impacts

Alternative 3A proposes a conveyance facility that is an unlined canal resembling the existing channels in the Delta. The 44-mile canal would generally consist of a trapezoidal section with gentle side slopes and a top width of around 340 feet and a depth 27 feet. The pipeline facility in alternative 3C would consist of three side-by-side buried 18 foot inside diameter concrete pipelines. The total distance of the pipeline route is approximately the same as the canal alignment. The construction activities to bury the pipeline would disturb about half the acreage as the canal. The impacted area in each option would be mitigated on a replacement of in kind land on a 1 to 1 acreage ratio.

Water Crossings

In order to convey water across rivers and sloughs, the open canal option in alternative 3A would require 11 inverted siphons. The siphons would cross under four major rivers and seven sloughs. The pressurize buried pipeline in alternative 3C would cross under the same waterways. The environmental impacts of these crossings would be similar for both alternatives.

Bridge and Utility Relocations

For the open canal option in alternative 3A, bridges would be constructed over the canal for all county roads, state highways, and railroad crossings. In alternative 3C the pipeline will cross under the same facilities. The construction impacts of the two methods would be similar; however, the elevated bridges across the canal would have more visual impact than the buried pipeline.

Water Quality Protection

The buried pipeline is less vulnerable than an open canal to introduction of pollutants, such as those introduced by spills, storm water and agricultural runoff, and sabotage. Given that there is many miles of open water above the intake and miles of open water from the pipelines exit into Clifton Court Forebay to the point of use, the added benefit of this protection appears minor.

Safety

There would substantially less safety measures needed along the route of the buried pipeline than the open canal. Both facilities would be designed to current safety standards and the safety

components included in the project cost.

Seepage Protection
There would be insignificant, if any, seepage from the pipeline. There would be seepage from the unlined canal. Monitoring wells along the route of the canal would be installed to identify areas that may have excess seepage. In those areas a program and facilities such as seepage interception wells would be installed to protect adjacent lands from seepage problems. The cost of this type of program and facilities is included in the cost estimate that follows.

Service Areas
It would be easier to construct turnouts from the canal than the pipeline to provide water to service areas along the route. To connect pressurized feeder lines to the pipeline to serve these areas would be more expensive and could present operational problems.

Seismic
Both the canal and the pipeline would be designed to the California design code for seismicity. The cost for design and construction for seismicity are included in the cost estimate.

Right-of-Way

The right-of-way width for the open canal option would be 1,000 feet for the 44-mile length and would include a total acreage of 5,330 acres. The majority of the disturbed land would be agricultural. Much of the acreage would be used for spoil disposal which could be converted into wildlife habitat. The pipeline option in alternative 3C would require a right-of-way of approximately 2,515 acres of land, about half the acreage required by alternative 3A. The impacted area in each option would be mitigated on a replacement of in kind land on a 1 to 1 acreage ratio.

Costs Comparison

The following table compares the capital cost of the two alternatives. The costs were derived from the references listed in the table and were adjusted to include the mitigation acreage. Each item in the table includes contingencies and engineering, legal, and project administration costs.

Although the table displays a single number for comparison purposes, the costs are preliminary and should be expressed as a range -10% to +25%.

Costs of the canal option are as of March 1997. Where as the cost for the pipeline were estimated one year earlier in January 1996. The escalation of cost between the two dates has little impact on

this comparison.

Isolated Delta Conveyance Facility (5,000 cfs) ($Millions)		
Cost Item	**Canal[1]**	**Pipeline[2]**
Intake Facilities	$152	$132
Pumping Plant	46	125
Bridge & Culverts	42	
Canal (includes Right-of-Way Costs)	288	
Siphons	226	
Pipeline (includes Right-of-Way Costs)		1,735
Mitigation (cost adjusted to $10,000/ac)	53[3]	25[3]
Planning (permitting, EIR/EIS, etc)	50	50
Total Estimated Capital Cost:	$857	$2,067

1) CALFED Bay-Delta Program, "DRAFT - Facility Descriptions and Update Cost Estimates for Isolated Delta Convey Facility", March 28, 1997
2) CALFED Bay-Delta Program, "DRAFT - Preliminary Evaluation of 5,000 cfs Isolated Transfer Facility using Buried Pipeline", January 29, 1996
3) Mitigation cost added on a 1:1 replacement ratio for the full right-of-way acreage

These costs show that the pipeline option would cost about two to three times that of the canal. In addition, the pipeline energy requirement is $11 Million more per year that the canal. Using a three percent discount rate for 30 years would result in a capitalized cost of approximately $220 Million more for the pipeline option.

Other Considerations

There are a few possible tradeoffs between the two conveyance options. Two of the more significant are:

- The open canal option offers the potential for recreation and habitat areas enhancement in

the large right-of -way, whereas wildlife habitat could be established over the top of the buried pipeline option.

- Future expansion of the facility would require screening and pumping plant enlargement for both options, canal modifications and siphon enlargements for the canal option, and new pipelines for the pipeline option.

Since the disturbance impacts associated with the canal and pipeline will be mitigated, the preference in the first tradeoff would depend on the point of view of the reader. The difference in cost of future expansion for both options would be similar to the relative difference in costs in the table above.

Recommendation

Given that the alternatives 3A and 3C are identical except for the conveyance method, the environmental impacts of both alternatives can be mitigated so that the difference between the impacts are slight, and the conveyance method in 3C costs 2 to 3 times that of 3A, it is recommended that alternative 3A adequately represents the alternative concept and alternative 3C be dropped from consideration.